

CLAIMS (STATUS)

1. 1. (Canceled) In apparatus, in the dissipation of heat through a surface area of
2 a component of said apparatus, the improvement comprising :
3 a first transfer of said heat radiating from said surface area of said component to a liquid
4 medium comprising liquid passageways in a component in contact with said surface
5 area, and,
6 a subsequent transfer of said heat in said liquid medium to a gaseous medium.
- 1 2. (Canceled) The improvement of claim 1 wherein said a subsequent transfer of said
2 heat in said liquid medium to a gaseous medium includes said gaseous medium
3 conveying said transferred heat and radiated heat from said apparatus to an ambient
4 outside said apparatus.
- 1 3. (Canceled) The improvement of claim 17 wherein said component in
2 contact with said surface area has at least one serpentine shaped passageway.
- 1 4. (Canceled) The improvement of claim 3 wherein said serpentine
2 passageway is a plurality of said passageways resulting from top and bottom plates
3 each with a protruding interdigitating pathway configurations.
- 1 5. (Canceled) The improvement of claim 2 wherein said component in contact with
2 said surface area has at least one serpentine shaped passageway.

1 6. (Canceled) The improvement of claim 4 wherein said serpentine passageway is a
2 plurality of said passageways resulting from top and bottom plates each with a
3 protruding interdigitating pathway configurations.

1 7. (Canceled) The improvement of claim 4 where said component includes
2 an embedded pump at a site connected to said at least one serpentine pathway.

1 8. (Canceled) The improvement of claim 6 where said component
2 includes an embedded pump at site joining four serpentine pathways at a pump site.

9. (Canceled) In the dissipation of heat through a surface area of an integrated circuit
2 in electronic apparatus,
3 the improvement comprising :
4 a transfer component for transfer of said heat radiating from said surface area of said
5 integrated circuit to a liquid medium
6 said transfer component including a member in contact with said surface
7 having passageways for a liquid medium.

1 10. (Canceled) The improvement of claim 9 including a heat exchanger adapted to
2 transfer said heat through a gaseous medium to an ambient of said electronic apparatus.

1 11. (Previously amended) The improvement of claim 18 wherein said transfer of said
2 heat in said liquid medium to a gaseous medium includes said gaseous medium
3 conveying said transferred heat and radiated heat from said apparatus to an ambient
4 outside said apparatus.

1 12. (Canceled) In the dissipation of heat through radiating surface areas of integrated
2 circuits in electronic apparatus,
3 the improvement comprising :
4 a transfer component for transfer of heat radiating from the radiating surface area of said
5 integrated circuits to a liquid medium,
6 said transfer component having first and second essentially parallel sides with
7 the radiating surface area of each integrated circuit of an array in contact with
8 one of said sides,
9 said transfer component including a heat exchanger adapted to transfer said heat
10 through a gaseous medium to an ambient of said electronic apparatus.

1 13. (Canceled) The improvement of claim 12 wherein said transfer of said heat in said
2 liquid medium to a gaseous medium includes said gaseous medium conveying said
3 transferred heat and radiated heat from said apparatus to an ambient outside said
4 apparatus.

1 14. (Canceled) The process of transfer of heat from an area of densely positioned
2 sources radiating through a planar surface of an element of an electronic apparatus,
3 comprising the steps of:
4 providing a radiation to liquid heat transfer component positioned in contact with said
5 area on said surface, and,
6 providing a heat exchange mechanism operable to transfer heat in the liquid in said
7 transfer component to a gas.

1 15. (Canceled) The process of claim 14 including the step of passing said gas over
2 radiating portions of said apparatus in exhausting said gas to an ambient outside said
3 apparatus.

1 16. (Previously Amended) The process of claim 20 including in said providing, a
2 radiation to liquid, heat transfer component, positioned in contact with said area on said
3 surface, step, the further providing of multiple serpentine liquid passageways in said
4 component.

1 17. (Currently Amended) A structure for the dissipation of heat radiating through a 2
2 surface area of a component of said structure, the improvement comprising:

3 a planar shaped radiation to liquid heat transfer member positioned in contact with said
4 surface area of said component;

5 said component being in contact with said surface area and having at least one serpentine
6 shaped passageway, said serpentine passageway being a plurality of said passageways
7 resulting from top and bottom plates each with a protruding interdigitating pathway
8 configurations; and
9 said wherein said component includes an embedded pump at site joining four serpentine

10 pathways at a pump site;

11 said planar shaped transfer member having passageways for a heat receiving liquid, and, a
12 second heat transfer capability operable top transfer heat in said first heat transfer
13 member to a gaseous medium.

1 18. (Currently Amended) In the dissipation of heat through a surface area of an integrated
2 circuit having chips in an electronic apparatus the improvement comprising:

3 a planar shaped transfer component positioned in contact with said surface area of said
4 integrated circuit having chips for transfer of said heat radiating from said surface area of
5 said integrated circuit having chips to a liquid coolant medium,
6 said transfer component having passageways for said liquid coolant medium and
7 said coolant moving in said passageways, said passageways and said coolant therein being
8 situated parallel to a plane of said integrated circuit having chips, and

9 heat exchange means adapted to transfer said heat through a gaseous medium to an ambient of
10 said electronic apparatus.

19. (Currently Amended) In the dissipation of heat through radiating surface areas of
integrated circuits having chips in an electronic apparatus the improvement comprising:

a planar shaped transfer component for transfer of said heat radiating from said radiating surface
area of each of said integrated circuits having chips to a liquid medium,

said transfer component having first and second essentially parallel sides with the radiating
surface area of each integrated circuit of said integrated circuits having chips being positioned in
contact with one of said sides and

a heat exchanger component adapted to transfer said heat through a gaseous medium to an
ambient of said electronic apparatus.

20. (Currently Amended) The process of transfer of heat in a chip-containing electronic apparatus from ~~an~~ densely positioned sources of heat, each of said sources radiating through a planar surface of ~~an~~ a chip element of said electronic apparatus, comprising the steps of: providing radiation to a liquid heat transfer planar shaped component having first and second essentially parallel surfaces with liquid passageways containing a liquid between said essentially parallel surfaces positioned in contact with said radiating surface in said apparatus, and, providing a heat exchange mechanism operable to transfer heat in the liquid in said ~~planer-planar~~ shaped transfer component to carry away all radiated heat from said chip-containing electronic apparatus and having a second system wherein a gas loop is arranged to carry away all radiated heat from the apparatus and the heat in the liquid to gas heat exchanger and exhaust said a gas to the ambient.

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